Judging fabric quality

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CONTENTS

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JUDGING FABRIC QUALITY

by

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Today's consumer looks for satisfactory quality as well as attractive appearance when buying textiles for clothing and household purposes. Never before have the stores offered so wide a variety of fabrics from which to choose, both in yard goods and ready-made articles. They come in myriad hues, textures, designs, and weaves. Chemists are continually perfecting new colors and finishes and making synthetic fibers from materials formerly unthought of as textile possibilities. Textile designers are steadily adding to the array of patterns, in line with modern trends in form and color. Inventors and manufacturers keep pace by providing machinery to produce these new designs and fabrics in quantity for speedy distribution on a national scale.

Each season brings also a new crop of names for weaves, colors, finishes, fabrics, and even fibers, with the result the consumer is at times more hindered than helped in locating the fabric for a particular purpose. It is no longer possible to pick up a fabric and tell what it is made of merely by a casual look and feel. Yet today, just as when to another generation "all wool and a yard wide" told most of the story, the person who buys a fabric wants to know what it is made of, what service it can reasonably be expected to give, will it hold its color, can it be laundered or dry-cleaned, is it warm or cool as compared with others of its kind, will it shrink or stretch and, if so, how much. Few labels give all the facts.

So in answer to widespread demand from consumers, facts on modern fabric construction and finish are brought together here to serve as a background for judging quality.

Fiber Identification Important

Fiber is the point the consumer checks first in a fabric. Is it made of cotton, linen, wool, silk, synthetic, "hair," or a mixture of fibers? Each has certain characteristics of its own; and unless the consumer knows what fiber is being bought, it is impossible to get satisfactory service from a fabric or to give it proper care.

Sometimes a fabric is made entirely of one fiber. But today the more common practice is to combine two, three, or even more fibers. This makes fiber identification difficult. Besides synthetics are spun and finished to look like natural fibers, and many finishes and treatments are given to both yarns and fabrics.

To aid the purchaser there need to be informative labels on fabrics—labels that give the fiber content in terms of percentage. Indefinite statements such as "part wool" or "silk and acetate" are of no help. "Part wool" may mean a material that is only 5-percent wool, or one that is almost entirely wool. Nor does such a label tell what is the rest of the fiber in the fabric.

If a fabric contains only one fiber, it may sometimes be identified by a simple test. At other times complete identification of the fibers is possible only in a laboratory. In any case, knowing the earmarks and some of the practical tests for each of the principal fibers is a valuable part of shopping knowledge.

Cotton

Cottons are put to more uses than any other textiles. They are suitable for a multitude of industrial purposes as well as for an almost endless variety of clothing and household uses. In texture they range from heavy, linenlike materials that tailor well to gossamer organdies and marquisettes for dainty party dresses and filmy glass curtains. They are especially suited to children's clothing, to house dresses, to men's work clothes, and to sheets, pillowcases, and other bedding.

Cotton fabrics wash easily and, except for novelties and very fine fabrics, are relatively inexpensive. The fine cottons are higher priced because only the long-staple fibers limited in supply are used for their manufacture and more processes are required to produce the fine cotton yarns.

Mercerization, a chemical treatment applied either to the yarn or to the cloth makes cotton lustrous, smooth, stronger, and more resistant to soiling. Mercerized cottons also take the dye better.

In cottons, as with other materials, greatest satisfaction comes from fabrics that have a pure finish (are virtually free from removable sizing substances) and are woven firmly enough to hold their shape. Take, for example, two qualities of muslin. A good-quality muslin has a smooth, firm texture due to uniform yarns regularly spaced throughout the cloth. It looks practically the same after washing as before because the body depends upon the amount of cotton put into the yarn, not upon a finishing process or sizing material. A poor-quality muslin, on the other hand, has uneven yarns, perhaps defects in the weave, and excessive sizing that gives body to the fabric when it is new but disappears in the washing, leaving the cloth limp and porous.

Pure finish

Once in a while in cotton cloth the ply of the yarn—that is, the number of single strands twisted together to form the yarn for weaving—is used to denote quality. For example, in cotton broadcloth, particularly in men's ready-made shirts, the term "two-by-two" is commonly used. This means that both the warp and filling yarns are plied. In these materials there are about 225 plied yarns to the square inch. This makes a fine cloth. In "two-by-one" broadcloth only the warp is a ply yarn. The filling yarns are single. The material is coarser, and the total number of yarns to the square inch is much lower—approximately 175.

In buying cotton lace, though a quite different type of fabric, it also pays to look for good balance. Heavy designs on fragile backgrounds soon break out. A firm lace in which the design covers practically all the surface, leaving only a small amount of mesh, wears well. On the other hand, soft laces with scattered designs and considerable mesh snag, stretch, and sag. For greatest satisfaction avoid corded edges around the design motifs. These corded edges roughen, and the fine yarns holding them in place break. Then the loose loops snag readily.

Since one of the chief virtues of cottons is that they wash and iron easily and, if necessity demands, can even be sterilized at high temperatures, it is well to check on shrinkage and color permanence (pp. 18, 19). Some cotton yard goods and ready-made articles have also been given special finishes (pp. 20 to 22).

When a lighted match is touched to an untreated, all-cotton material, it burns quickly with a yellow flame that flashes along and is difficult to put out (p. 10).

Testing for cottons

The burning cloth gives off an odor of burning paper, burns almost completely, and leaves practically no ash. Mercerized cotton burns a little less rapidly than the untreated, and what ash there is, is black.

This burning test for cotton, or any other fiber for that matter, is satisfactory only when the fabric has not had some special finish and when just one kind of fiber has been used. Cottons with a special finish sometimes burn with a flame similar to the untreated, but they char rather than burn completely, and the ash retains the shape of the original cloth (p. 10).

Linen

Linen is stiffer and more lustrous than cotton. Many of the heavier linens, especially the table damasks, have a leathery feel. Linen materials absorb water readily and, unless the fabric is heavy and closely woven, they dry quickly. Because of this rapid evaporation of moisture, the thinner linens are very desirable for hot-weather wear. Most linen fabrics are made from long, smooth fibers, and have a smooth surface which does not soil readily. However, some of the newer type dress linens made from crepe and ratine yarns have a rough, nubby surface. These soil easily. Linens launder so well that they are softer and often more beautiful after several tubbings than they were when new.

Length of fiber directly affects the quality of linen fabrics. The long fibers of flax, called line, go chiefly into the finest linen materials such as high-grade table damasks and dress linens. The short and broken fibers, called tow, are put into coarser fabrics such as toweling, crashes, and novelty luncheon cloths. Even though a fabric may be labeled "all pure linen," there is still the distinction to be made between line and tow fibers.

Line and tow fibers

Since the tow fibers are shorter than the line, they make weaker yarns. They are also coarser and cannot be spun into so fine a yarn as the line. Fabrics made from tow yarns tend to lint and get fuzzy. They are less lustrous than those made from line. However, bright rayon yarns (p. 12) are often used with the

tow to give greater luster to the fabric. Because of irregularly spun yarns, fabrics made from tow are not uniform in weave.

Not all coarse, irregularly woven linen materials are made from tow yarns. Many of the finer ones are made from "grass linen," more correctly called ramie. This fiber is used principally for tablecloths, napkins, bridge sets, tray cloths, and dresser scarfs. Fabrics of ramie have many of the properties of linen, but they are usually thinner and generally decorated with embroidery.

The natural color of linen is gray. Much that is sold over the retail counter is wholly or partially bleached. This bleaching is done by chemical methods or by spreading the cloth on the grass in the sunshine. Grass bleaching is much slower but causes less weakening of the material. Linen is sold in different degrees of bleach, "full," "half-bleach," and "natural." The more the cloth is bleached the more it is weakened so that a piece of full-bleached linen is weaker than one only half-bleached. For this reason many women buy half-bleached or three-quarter-bleached table linen instead of the fully bleached. They know it will gradually whiten during use.

Linen fibers are naturally stiff, and fabrics made from them usually have more body than fabrics made from softer fibers. Some linen fabrics, however, are so loosely woven from such poor-quality yarns that a sizing material is necessary to give them body. When buying dish towels, for example, hold them up to the light to see whether the individual yarns stand out or whether the fabric appears to be glazed over. After this glaze, or sizing, is washed out the cloth becomes sleazy, porous, and limp.

Because of the natural stiffness of the fiber, linens wrinkle readily and have to be pressed with each wearing. This objection is being overcome to some extent by special finishes (p. 20). However, many of these crease-resisting treatments are still in the experimental stage, and their effectiveness, as well as their lasting quality, varies greatly.

Without a microscope it is often very difficult to distinguish between linen and cotton. The two burn so much alike that the burning test is not satisfactory. They can, however, sometimes be distinguished by the break test. Ravel out a yarn and break it. An all-cotton yarn breaks with a brushy end; an untreated, all-linen yarn breaks with a pointed end. Linen yarns that have had a special finish may have a fluffy break like a wool yarn.

The break test

Silk

Silks are either pure-dye or weighted according to the kind and amount of finishing materials they contain. The Federal Trade Commission rules of November 4, 1938, define a pure-dye silk as one made exclusively of silk fibers, containing no metallic weighting, and no other foreign substances, except that necessary for dyeing and finishing which shall not exceed 15 percent for black silks and 10 percent for other colors and white. The rules also provide for the labeling of silk containing metallic weighting and excessive finishing and dyeing materials of other types.

The practice of weighting silk results from attempts to restore part of the weight lost when the natural gum is removed from the fiber. This gum, known as sericin, is a sticky substance which the silkworm secretes with the fiber. It hardens and, since most silk is woven in the gum, protects the fibers through the early stages of manufacture. After weaving, the gum is removed by working the fabric in hot soapy water. Since silk is a high-priced fiber and loses considerable weight during this degumming process, metallic salts and other substances called weighting are added to replace the loss in part at least. The term "pure dye," when used in this connection, has nothing whatever to do with the quality of dye used to give the fabric its color.

Pure-dye and weighted silks

Most pure-dye silks have a slippery smoothness. They are soft and pliable, and usually have a natural luster. The surface of the fabric is virtually free from protruding ends and therefore does not soil as readily as a fuzzy surface. Each season, however, brings out certain pure-dye fabrics with characteristics quite contrary to pure-dye silks as a whole. They may be dull and mossy in texture, as well as soft and pliable.

Heavily weighted silks are crisp and have a crunch when clasped in the hand. They have more body than pure-dye silks, but are less elastic and pliable. They wrinkle badly, cut along the seams and stitching lines, and soon split wherever there is wear. In fact they even split while hanging in a closet. Soluble finishing materials, sometimes called fillers or loading substances, may have little deleterious effect on wearing quality but often cause the fabric to water spot. They come out in washing and dry cleaning and leave the fabric flimsy. Weighted and loaded silks fool the uninformed buyer because they are heavy and seem to be luxurious.

Spun silk, like the long-fiber or thrown silk, may be either pure-dye or weighted. In contrast to long-fiber silk, spun silk is made from short fibers that come from tangled and broken filaments on the outside of the cocoon; from imperfect cocoons and those opened by the escaping moth; from waste incident to manufacturing; and from wild silk (that produced under less protected conditions than the cultivated silk). Spun silk is used extensively in velvets, summer wash silks, and umbrella materials; in underwear and for some hosiery; and for combining with other fibers. Sometimes spun silk made from noils (one type of silk waste) is woven into fabrics and sold as raw silk. These yarns are irregular and uneven in size and produce silk of a rough, slubby texture. Spun-silk fabrics have fair wearing quality but are less lustrous than those made of long-fiber (thrown) silk.

Since it is impossible to tell how much weighting silk contains by the way it looks and feels, the consumer has to buy blindly unless there is a label stating "pure dye" or "weighted." Fortunately more and more manufacturers are putting labels on ready-to-wear garments, particularly if they are made of pure-dye silk.

The burning test

But label or no label, the consumer can use the burning test on yard goods. Pure-dye silks burn readily with a small blue flame, which is easily extinguished.

The odor is pungent, like that of burning feathers. The ash is black and shiny and forms in tiny, porous, brittle balls along the edge of the fabric (p.11). Weighted silk chars rather than burns and leaves a black ash of the same shape as the yarn or cloth (p. 11). The odor is the same as that of burning unweighted silk, though perhaps not so strong.

Wool and Hair Fibers

Wool, the fiber obtained from sheep, makes good protective clothing, blankets, and other household articles where warmth and long wear are essential. The tiny scales on the surface of wool fibers enables them to enmesh a considerable amount of air in a fabric. This air acts as an insulator and prevents the rapid escape of body heat. It also keeps cold drafts from penetrating to the body. Although wool fibers can absorb a great deal of moisture, they dry slowly; consequently the body does not chill readily in wool clothing. Wool also dyes easily and holds its color well, provided a good quality of dye is used. When wet, wool fibers soften so that rough handling or sudden change in temperature aggravates interlocking of the fibers. This makes them shrink or felt. Once the fibers have become felted, they cannot be separated without being severely damaged.

Wool fabrics are of two types—woolens and worsteds. Most woolens have a fuzzy, warm-looking surface as their nap more or less obscures the weave (p. 7). As a rule the cloth feels soft, fluffy, and springy, and is usually less firmly woven than a worsted. Because of the springiness and elasticity of the fibers, all wools wrinkle less than cotton, linen, or silk materials, but woolens are not so wrinkle resistant as worsteds.

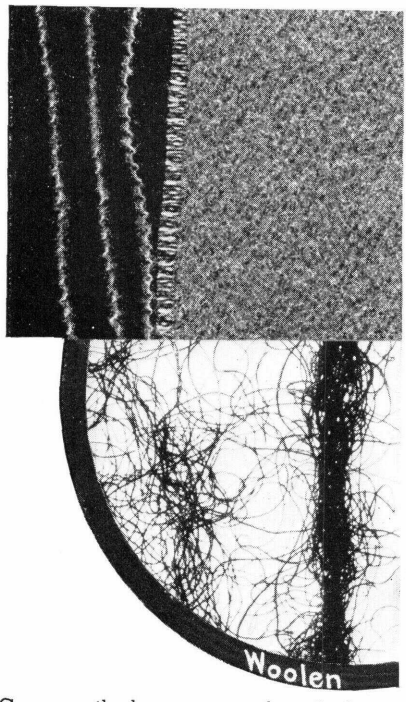
Woolens

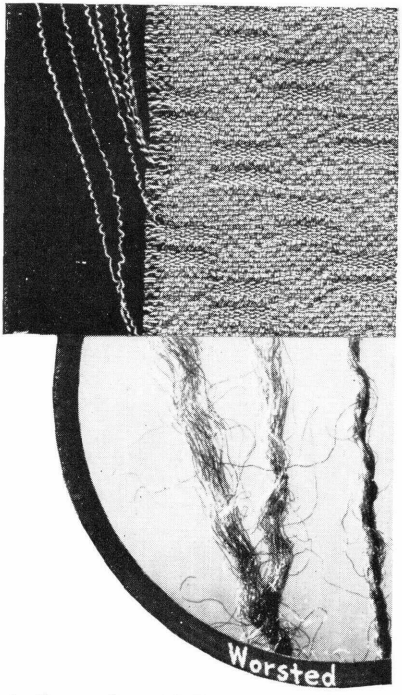
Typical woolens are homespun, suede cloth, tweed, flannel, broadcloth, and overcoating. The beauty of these fabrics depends largely upon the finishing processes. Woolens may be made from all new wool or mixed with cotton, spun staple rayon, or reworked wool. They are long wearing when well-made from good materials.

Very interesting two-tone novelties are produced nowadays by mixing rabbit hair (commonly called Angora) and the down of goose or duck or ostrich feathers with wool. The feathery down gives a "frosted" look to the cloth because it usually dyes a lighter color than does the wool (p. 7); but being short, the down soon wears off and leaves bare spots.

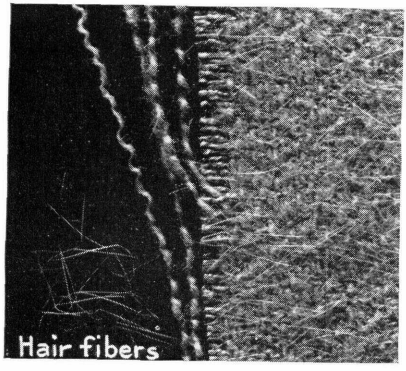
The heavy napping in woolens sometimes covers defects in the yarn and weave, particularly in the coarser, lower-quality fabrics. It may also weaken the cloth, especially if so much fiber is pulled to the surface that little remains in the yarn to give strength to the material.

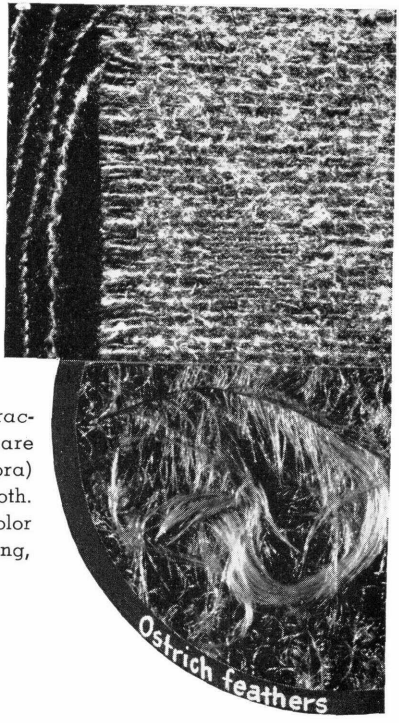
Some woolens that cannot stand a great deal of napping, especially inexpensive ones, have short waste fibers called flocks, fulled or shrunk into the cloth. Though these flocks make the fabric seem heavier and thicker, they soon work out because they are not twisted into the yarn. To determine whether a heavy





Compare the large, warm, fuzzy-looking yarns in the woolen with the small, clear-cut, wiry-looking yarns in the worsted. Note also the difference in the way the fibers are arranged in each (insets).





Some woolen fabrics get much of their attractiveness from fur fibers or feathers that are mixed with the wool. Rabbit hairs (Angora) catch the light and give a glint to the cloth. Because the ostrich down dyes a lighter color than the wool, it produces an interesting, two-tone "frosted" effect.

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nap is due to flocks, rub the cloth briskly with the hand. If excessive lint rolls up, part of the nap at least is probably due to loose fibers that were felted into the cloth. Such material will wear threadbare in a short while and look shabby.

Yarns in woolens are soft, woolly, and loosely twisted so that the fabric can be napped easily. The fibers in these yarns are entangled, crisscross, and are short, usually not over 4 or 5 inches in length (p. 7).

In contrast to woolens, worsteds have a distinctly visible weave (p. 7). Worsteds feel wiry and somewhat harsh; they have a clear-cut surface free from nap; and, as a rule, they are firmly woven. Worsteds tailor well, hold their press and give good service, but develop a shine. Typical worsteds are men's suitings, garbardines, and crepes. Certain lightweight worsteds made from fine, very tightly spun yarns are called cool wools. These are designed for summer wear and are especially desirable for persons susceptible to sudden changes in temperature.

Worsteds

Yarns in worsteds are tightly twisted, smooth, and hard. They are made from the longer, more lustrous, hairlike fibers which are combed as well as carded so that they lie fairly straight and parallel in the yarn (p. 7).

The fiber used in wool fabrics may be new wool—sometimes called virgin wool—or it may be reworked wool. Reworked wool is made from worn-out and discarded wool clothing and other similar fabrics, from manufacturing waste and scraps of new wool cloth, such as cuttings from tailor shops and garment factories. These are all disinfected, cleaned, torn apart, and respun, usually with some new wool or other fibers. Such a fiber is likely to be broken and shorter than new wool. However, its length depends largely upon the quality of the original fiber and the care with which it has been reclaimed and respun. Even though length of fiber is one measure of quality, it is difficult for the buyer to get an idea of how long the fiber really is by merely picking a yarn apart.

New and reworked wool

There are many grades and qualities of both new wool and reworked or reclaimed wool. Some of them give good service; others may prove unsatisfactory. At present there is no way that a consumer can distinguish between the two. It must be largely a guess on her part. However, the fact that an article contains some reworked wool does not necessarily condemn it, nor does the fact that it is made entirely of virgin wool always mean that it will give long wear. Wool in its virgin state has more resiliency, warmth, and strength than the same wool after it has been reworked or reclaimed.

Of the so-called hair fibers, mohair from the Angora goat is fine, somewhat wavy, long wearing, resilient, and nearly white in color. Fabrics made from it do not wrinkle easily, and mohair pile does not mat down or crush. But mohair, like wool, is very susceptible to damage by moths unless specially treated.

Hair fibers

There are also camel's hair, alpaca, vicuna—imported fibers obtained from the animals of the same name. The cashmere goat furnishes the soft, silky cashmere fiber prized for sweaters and knitwear. Another hair also used in knitting yarns

and dress fabrics comes from a long-haired type of domestic rabbit. It is known commercially as Angora, but must not be confused with the fiber from the Angora goat, which is known as mohair.

All these hair fibers have a high luster and react the same chemically as wool. They are generally combined with other fibers to make them easier to handle, go farther, and produce interesting effects.

The burning test may be used to determine whether or not a fabric is wool. This test is unsatisfactory, though, if other fibers are also present. Wool smoulders when ignited and gives off a disagreeable, acrid odor like that of burning hair. The crisp ash tends to ball up along the edge into an irregularly shaped mass (p. 10).

Home tests for wool

Another way to identify wool at home is by the alkali test. It can be used for mixed goods containing wool and cotton, linen, or rayon. Boil a sample of the fabric for 15 minutes in a solution of 1 tablespoonful of lye to 1 pint of water. Since wool dissolves in a strong alkali solution, it will disappear and leave only the other fibers (p. 13). This test cannot be used for silk and wool mixtures because the silk will dissolve also. However, these fibers look so different that they usually can be distinguished anyway. If not, a microscope affords the most accurate means of identifying the silk.

It is practically impossible for the inexperienced person to determine whether hair fibers such as mohair, camel's hair, or alpaca are mixed with the wool, but fortunately their presence is generally indicated by a label. In the not-too-distant future, the so-called synthetic wools (p. 13) made from proteins will probably present identification difficulties because of their similarity to wool in appearance and chemical composition. Then it will be even more essential to have the fiber content labeled, both as to the kind of fibers used and the amount of each.

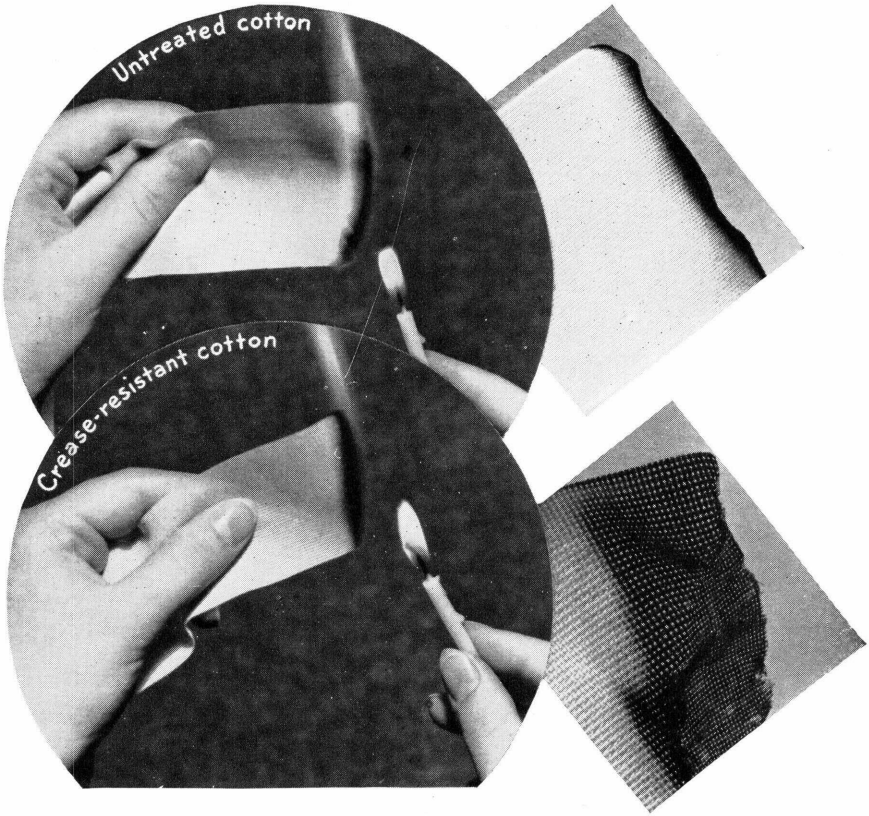
Rayon and Synthetics

Rayon is defined by the Federal Trade Commission as being the manufactured textile fiber or yarn produced chemically from cellulose or with a cellulose base.

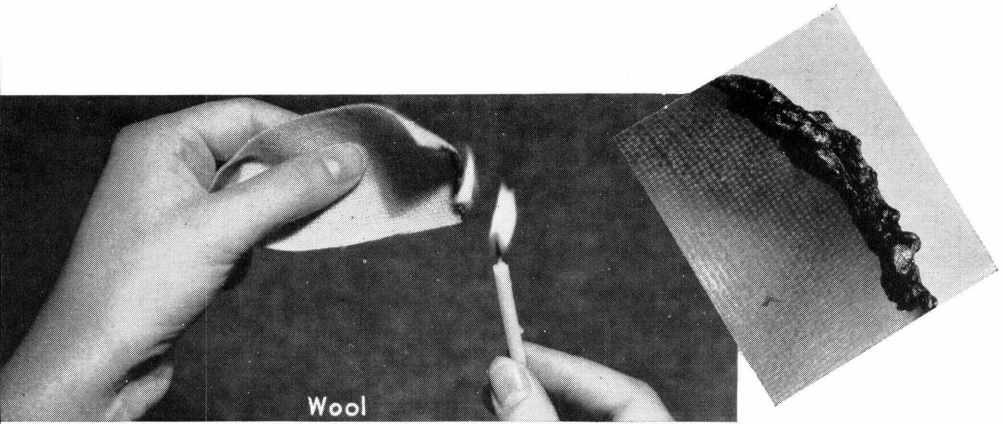
Three types of rayon—viscose, cuprammonium, and acetate—are made in this country at present. The viscose and cuprammonium have many of the same chemical properties as cotton. These types also burn like cotton and can be washed the same as any fine cotton materials, except that, since all rayons are weaker when wet than when dry, they require careful handling.

Viscose, cuprammonium, and acetate rayon

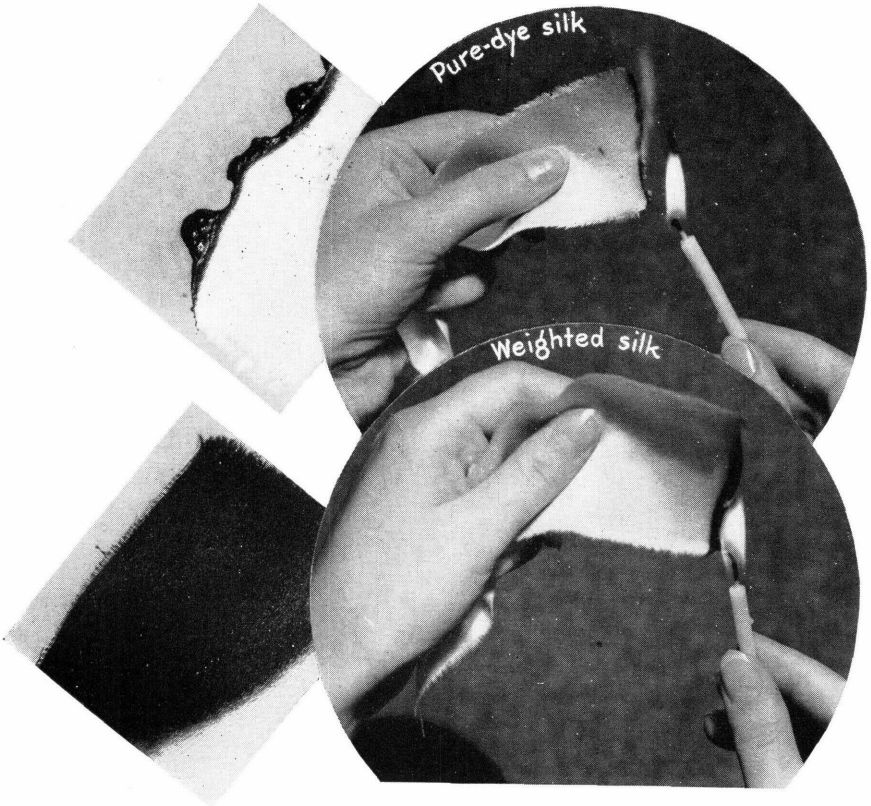
Acetate rayon, on the other hand, is cellulose acetate and has properties different from those of cotton. When touched with a lighted match it blazes, puckers, and curls as it "melts" into a hard, brittle, globular mass (p. 11). It dissolves in acetone (p. 12), the liquid commonly used to remove fingernail polish, and in chloroform, both of which are sometimes found in spot removers. Pressing with a hot iron sometimes melts this kind of rayon.



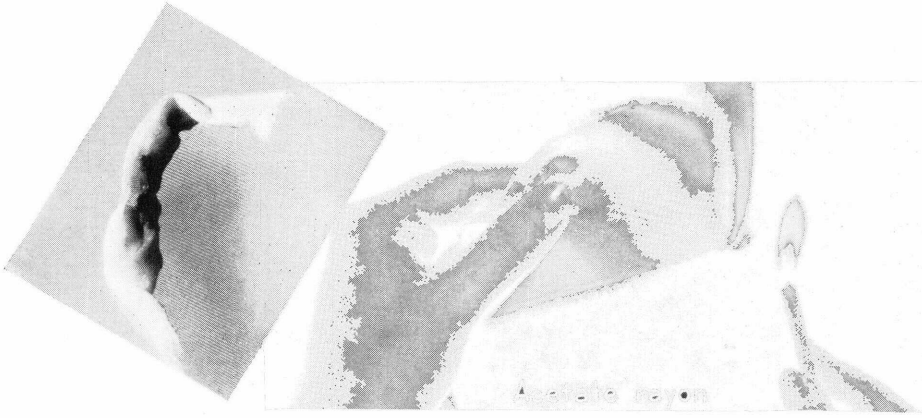
An untreated, all-cotton material blazes, burns almost completely, and leaves practically no ash. Cottons with a special finish sometimes burn with a flame, but they char rather than burn completely, and the ash retains the shape of the original cloth.



Wool smoulders as it burns but rarely flames up very much. The ash tends to ball up along the edge.



A pure-dye silk burns with a small flame; the ash is black and shiny and forms in tiny, porous, brittle balls along the edge of the fabric. A weighted silk chars rather than burns and leaves a black ash of the same shape as the yarn or cloth.



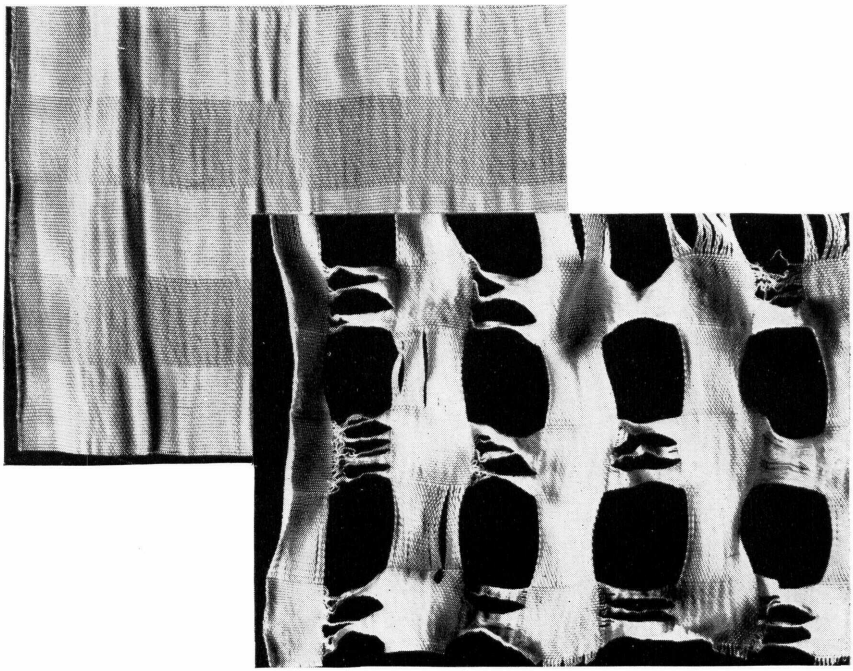
Acetate rayon blazes as it burns. The edges pucker and curl as it "melts" or fuses into a hard, brittle, globular mass.

Until a few years ago, practically all rayon was made in long and strands called filament rayon. More recently, much of the filament rayon is cut into short lengths and spun into yarns just as are cotton and wool. To make these short pieces easier to spin, they are sometimes curled and crimped in much the same way that hair is given a permanent wave. In some cases spun-rayon fabrics have the look of linen, with rather rough, uneven yarns. Others resemble wool challis and though similar to the touch they do not scratch or irritate the skin.

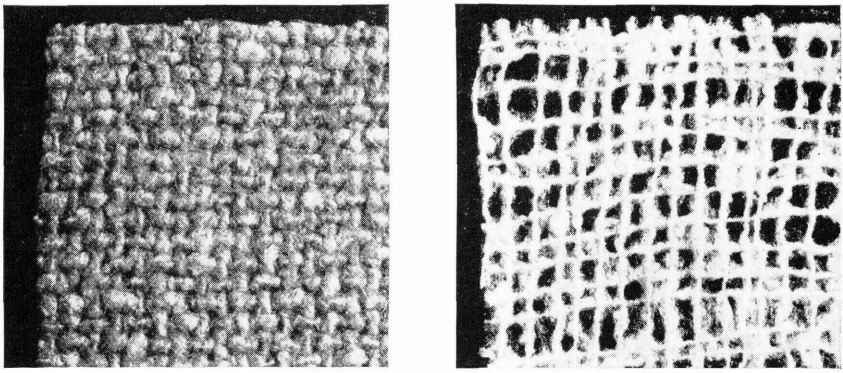
Filament and spun rayon

Practically all rayon materials have good draping quality. They absorb moisture or perspiration readily but do not dry quickly. Rayons tend to wrinkle and crease badly unless given a special treatment, but in most cases they wash easily and well. Many times the best results are obtained by ironing rayons dry, particularly the spun rayons. Unless the cloth is preshrunk, it is advisable to shrink it, allow it to dry, and iron without dampening. Then after the cloth is made up, it can always be ironed dry. This prevents uneven stretching.

Rayon has undergone great improvement since its debut as a textile material. Two main objections—low breaking strength, particularly when wet, and high luster—have been partly overcome. Rayons are now much stronger than originally, and very dull, as well as very bright, yarns can be produced. The brighter rayon yarns are suitable for satins, some drapery and upholstery



The heavy acetate rayon stripes dissolved when the material was soaked in acetone and left only the viscose yarns.



The rayon remaining (right) when the wool was dissolved from this coat material of spun rayon and wool shows strikingly how important it is to have fiber content labeled in percentage.

materials, and bedspreads. They are also used in combination with dull material to give decorative accents. The fully delustered rayons are better for hosiery, underwear, and crepes. Halfway between the very bright and very dull are the semidull yarns which give a certain amount of life to a fabric without pronounced sheen.

Other synthetics

Synthetic wool is made from milk casein and other proteins such as are obtained from soybeans and fish. The processes are somewhat like those used to make rayon in that the new material is dissolved and then converted into a filament. Usually the fiber is shorter, rougher, and duller than rayon. This new fiber has many properties in common with wool, but whether its development and production will follow that of rayon remains to be seen. So far the most satisfactory use of synthetic wools is in combination with natural wool.

Glass fibers are now produced for industrial purposes, and while there is as yet no general demand for them for household and clothing uses, they may be a potential textile material.

For some years synthetic, transparent wrapping material has been cut into narrow, threadlike strips and woven like yarns. Sometimes these strands are woven alone to make curtains, summer rugs, shoes, hats, and various costume accessories. They are also combined with other fibers to give luster to an otherwise dull fabric.

Yarns and Weave Affect Wear

Knowing what fiber is used does not solve all problems of textile selection. The quality of the fibers, the way they are spun, the amount of twist, and the ply of the yarn all have a great deal to do with the wearing quality of the cloth. The manner in which the yarns are interlaced to produce the material is largely responsible for its firmness and its resistance to snagging, fraying, and stretching.

Good fibers and good yarns generally make good serviceable fabrics, provided

the weave is suitable. Sometimes, however, poor fibers and poor yarns, if carefully spun and woven, will produce a material that will wear reasonably well for certain purposes and, if the price is in relation to the service that can be obtained from it, may prove to be a satisfactory purchase.

Fibers are spun into many types of yarns—some simple, others more complex. Single yarns are made by spinning many fibers together into one continuous length.

Kinds of yarns Sometimes two or more single yarns are twisted together to form a ply yarn. Thus a yarn made by twisting two single yarns together is a two-ply yarn; one made by combining three single yarns is a three-ply and so on. These multi-ply yarns must not be confused with multi-filament. A multifilament yarn is a single rayon yarn composed of many continuous strands which are held together with very little twist.

Core yarns, a type of complex yarns, consist of loose fibers wrapped around a tightly twisted central core. The core gives strength and lessens expense. It is generally of cotton. The so-called metallic yarns used in metal cloth and the filling yarn in some cotton and wool blankets are familiar examples.

Boucle and ratine yarns are also of the complex type. They are made by twisting single and plied yarns together under different tensions so that little kinks or bumps occur along the surface. Both the color and the fiber are often varied to produce novel and beautiful effects.

Generally yarns uniform in size throughout a fabric indicate good quality. With unevenly spun yarns, the thin places are likely to break easily if much strain is put upon them. However, if the unevenness is due to slubs (bits of carded fiber) twisted in at intervals the yarn itself may be no weaker than if the slubs were not there. Uneven yarns are used to a considerable extent now to produce interesting textures and to relieve the plain effect. But regardless of which way the large, heavy places are made, they extend above the surface of the cloth and more wear comes on them than on the rest of the yarn. This means that the warp or the filling yarns, as the case may be, get more wear where they cross the thick portions than elsewhere. Less service is to be expected from this type of fabric than from one made of evenly sized yarns.

Because of certain physical characteristics, the kind of fiber that is used in a yarn determines its size to a considerable extent. For example, wool fibers are larger than cotton so that the same quantity spun in exactly the same way produces larger yarn. For this reason, wool yarns have more covering power than cotton yarns, and they usually make coarser looking fabrics. In order to make fine wool yarns fewer fibers are used, and they are put through more spinning processes (see worsted yarns, p. 8).

The amount of twist put into a yarn also governs its size to some extent, as well as its strength. As a rule, tightly twisted yarns wear better than those that are soft and loosely twisted.

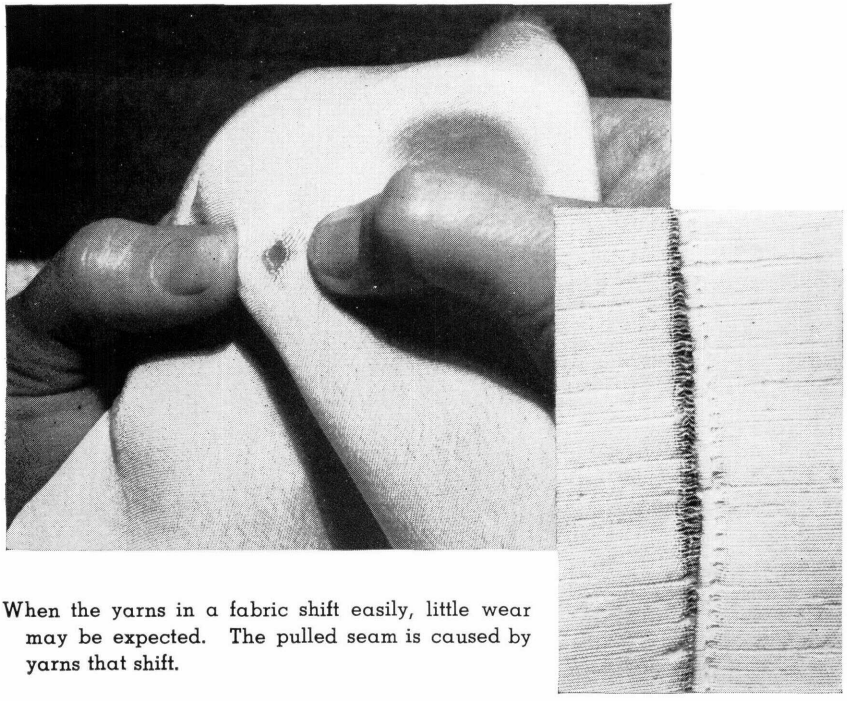
The plain, or over-and-under, weave is the simplest and perhaps the most durable type of construction. It is used in fabrics designed for hard wear.

Plain and fancy weaves

Muslin, gingham, percale, voile, and taffeta are examples of fabrics with a plain weave. The twill weave, identified by diagonal ridges, wears well and resists tearing, but it tends to stretch more than a plain weave because the yarns are not held so securely in place. Denim and serge are examples of the twill weave. Changing the direction of the ridges, as in a herringbone design, or varying their width results in interesting patterns.

The satin weave produces a smooth, lustrous fabric that drapes well. Since a warp yarn is crossed by only every fifth to eighth filling the warp seems to float on the surface of the cloth. When the floats are made by the filling yarns the weave is called a sateen weave. In either satin or sateen the loose floating yarns get more wear, and the surface is apt to roughen or to catch and snag easily. Also where there are too few yarns in either direction there is danger of shifting.

These three fundamental weaves have many variations which make almost countless fancy designs and textures. The elaborate woven-in designs of damasks and brocatelles; the huckabuck or small, all-over, honeycombed pattern of birdseye diaper cloth; the gauze or leno weave, which creates the filmy, lacy effect in marquisette; the pile weave which gives to carpets and upholsteries their thick luxurious pile—these are all such variations. The weaving process for these fabrics is nearly always slower and the cost of the fabrics higher than

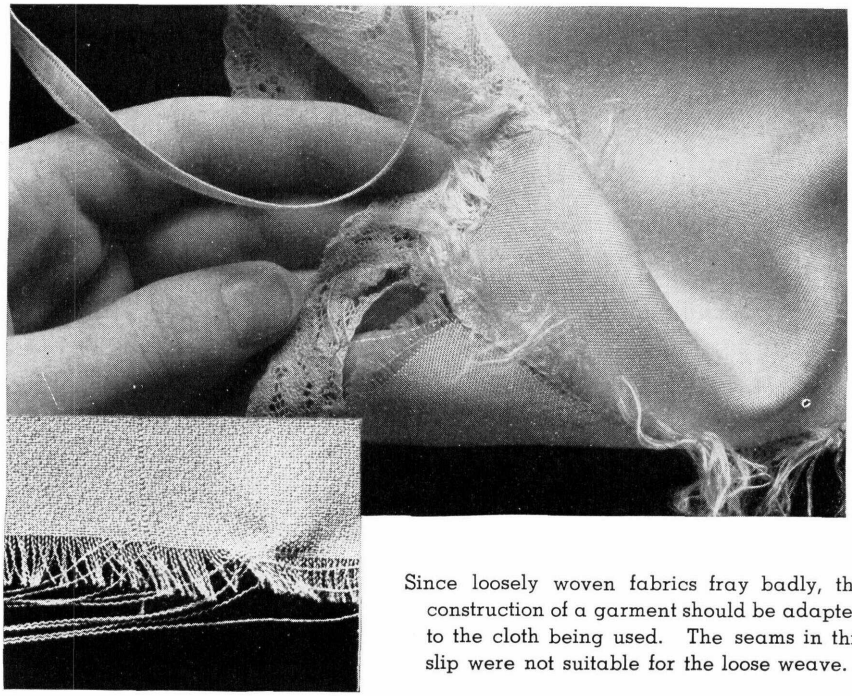


When the yarns in a fabric shift easily, little wear may be expected. The pulled seam is caused by yarns that shift.

for those of simpler construction. In some instances, too, the fabrics are less durable than those made in plainer weaves.

Look for firm weaves when long service is desired. Ordinarily, a closely woven fabric keeps its shape better, shrinks less, pulls less at the seams, and wears longer than a loosely woven cloth of similar texture and weight. To judge the firmness of a cloth, first hold it up to a strong light. Notice whether the yarns, both warp and filling, are uniformly spun, practically the same size, and evenly spaced. Then try to shift the yarns. Grasp the cloth with thumb and first finger of each hand and pull gently (p. 15). Try this in both the lengthwise and crosswise direction. If the yarns shift easily or if the fabric becomes puffy in places, it will pull along the stitching lines (p. 15). Look also at the cut edge of yard goods and at the seams of ready-made articles. The amount of frayage is often an indication of the looseness of the weave (below.) Fraying may also be done to the fiber from which the fabric is made. For example, some types of rayon fray more than other fibers woven in a similar construction. Sometimes, however, excessive frayage does not show up until after the fabric is washed because sizing materials hold the yarns in place while the cloth is new.

Good balance in a fabric (approximately the same number and size of warp and filling yarns in an inch of cloth) makes for good wear. However, in some cases the very nature of the fabric makes an equally balanced construction impossible. For example, a true broadcloth always has from one and a half to two times as many warp yarns as filling yarns.



Since loosely woven fabrics fray badly, the construction of a garment should be adapted to the cloth being used. The seams in this slip were not suitable for the loose weave.

Design Influences Serviceability

Study the method used to introduce the design and observe whether wear will remove it easily. Designs and patterns produced by the weave or by contrasting yarns usually last as long as the material holds together. Gingham, either checked or plaid, made by combining yarns of different colors, and striped shirting madras, in which different-colored yarns and weaves are combined, illustrate this type. If the colored yarns are of a different fiber than the rest of the fabric, though, the two may not wear alike. For example, a rayon stripe in a madras may not wear as long as the cotton foundation cloth.

Textural and woven-in designs

Weave alone, not color, produces some patterns. These are sometimes called textural designs. Some examples are the corded and ribbed effects in dimity, poplin, and broadcloth. Since a fine yarn cannot stand the strain from a heavy one in the other direction, a fabric so woven may not be durable. The occasional coarse warp yarn in dimities brings more wear on the filling than on the fine warp. For this reason, splits usually occur alongside the coarse yarns in this type of material.

A true crepe is another example of a woven-in textural design. The crepe effect comes from a difference in the tension on groups of warp yarns during weaving, as in seersucker, or from a difference in the direction the yarns are twisted. Such crepes are permanent and remain as long as the fabric lasts. Imitation crepes are made by embossing or by printing cloth with an alkali, which causes shrinking wherever it touches the fabric. These crepes are not permanent. To determine whether or not a crepe is permanent, stretch the fabric between the hands. If it stretches out smooth, the crepe will disappear with wear or washing.

Sometimes the woven-in crepe is exaggerated by various finishing methods. Such heavily creped fabrics, stretched and dried under tension during finishing, are likely to shrink greatly in washing or dry cleaning. They may be stretched back, but often articles made from them must be refitted or discarded.

Surface designs such as printed patterns, paste dots, moire, and some embroidered dots and figures are applied after the cloth is woven. Some designs applied in this way last as long as the fabric holds together; others are not permanent. White dots or small designs on a dark background are often made by printing on the dyed cloth a chemical that removes the color. The white designs produced by this discharge method have been known to turn into holes before the body of the fabric showed signs of wear. Unfortunately, it is impossible to tell in the store whether the white designs on a dark ground have been made by the discharge method.

Printed designs

Dots applied with paste or glue often wear off where there is friction. Also they are likely to soften and peel off when the fabric is laundered or dry cleaned.

Designs painted on fabrics may be dimmed by washing or may disappear entirely in dry cleaning. Before buying such material, it is well to get a sample and wash or dry clean it to see whether the paint in the design is soluble.

Moire, another type of printed design, is made on silks and acetate rayons of a rib weave. In light-colored silks, the watered effect may not be permanent. In dark colors it seems to be more lasting, probably because the fabric is not washed or dry cleaned so often. The moire in both light- and dark-colored acetate rayons is permanent because some of the surface yarns are actually melted and slightly fused together.

If a fabric has a surface design arranged in straight lines such as a stripe, plaid, or straight floral pattern, make sure that it is printed straight with the warp and the filling yarns. If not, it is often impossible to match the design, and whatever is made from it will not hang true.

Colorfastness, A Safeguard

Since many fabrics fade badly, particularly when washed or when worn in strong light, it is advisable to inquire about colorfastness.

The fastness of dyes depends upon the type of dyestuff and the method used in dyeing. If a color fades, it is because of a wrong choice of dye or an unsatisfactory method of dyeing. Once a fabric is dyed, nothing can be done to set the color. The common household practice of soaking in a solution of salt, vinegar, or sugar of lead is useless and a mere waste of time.

Vat dyes are most satisfactory for cotton. Such dyes are developed right on the fiber and become a part of it. They are fast to washing, light, acids, alkalies, and in some cases to bleaching agents. Indanthrene dyes (a term often seen on labels) are a special class of vat dyes, which are also fast to light and washing. Whether the dye is applied to fiber, yarn, or a piece of woven cloth determines to some extent the colorfastness of a fabric. As a rule, stock (in the fiber) dyeing gives better penetration than does either yarn or piece dyeing and naturally better colorfastness is to be expected though not assured.

Methods of dyeing

Sometimes the method of dyeing can be determined from the finished cloth. Ravel a yarn from the material and look at it closely. If white or light spots occur at regular intervals, the fabric was piece-dyed, and only the surface of the yarns took the dye. In other words, the dye did not penetrate where the warp and the filling yarns crossed. Such fabrics can be expected to fade.

If the fabric shows no evidence of piece-dyeing, untwist the yarn. If the center is white or lighter than the surface, the dye was probably applied to the yarn. But if the color is uniform throughout the yarn, that indicates stock dyeing. There are cases, however, where very good penetration of dye by one of the other methods will produce practically the same result.

Dyes should be fast to the conditions under which the fabric will be used. These may include one or more of the following: Light, washing, perspiration, bleaching, ironing, steaming, or dry cleaning. Theoretically it is desirable before purchasing yard goods to test a sample in the same way the goods will be used. That is, if the cloth is to be made into a wash dress try washing and ironing part of the sample the

Value of a label

same way that the dress will be laundered. If the dress is to be dry cleaned, dip half of the sample into gasoline or some other dry-cleaning solvent. If the material is for draperies that will get lots of sun, cover part of the sample with a cardboard and expose the other part to strong sunlight for several days. In practice these tests often take so long that the material is all sold before the experiments are completed. Therefore the consumer really needs labels that give information concerning the fastness of the color.

Shrinkage Control

Shrinkage in fabrics causes the user inconvenience and sometimes serious loss of labor and material. Even when yard goods is shrunken before it is made up, there is no certainty that it will not shrink more. Furthermore, household methods of shrinking fabrics take away some of their fresh, new look.

Nowadays commercial methods are used to shrink cloth sold by the yard or in ready-made garments and household articles. For some household textiles, such as sheeting, preshrinking is as yet impractical because of the added cost of the treatment.

Trade-practice rules on shrinkage of woven cotton yard goods, issued by the Federal Trade Commission on June 30, 1938, regulate to a considerable extent statements that may be made about preshrunk cotton materials. They do not, however, apply to fabrics other than cotton. Even though a woven cotton fabric is labeled "fully shrunk," "will not shrink," "shrinkproof," or the like, it can under certain treatments practically always be made to shrink further. For this reason these general statements mean little, and under such circumstances their use is prohibited by the Commission's rules.

Trade-practice rules

To be of real help, the label should not only state that the fabric has been subjected to a shrinking process, but, in addition should give the upper limit for the amount of shrinkage remaining after it is washed a specified way. For example, in accordance with the Federal Trade Commission rules, the label might read "Preshrunk or shrunk—will not shrink more than 1% under Commercial Standard CS59–36" or "Preshrunk (or shrunk)—the residual shrinkage will not exceed 1% under Commercial Standard CS59–36." In effect this means that if a label states the residual shrinkage does not exceed 2 percent, the cloth will not shrink more than three-fourths of an inch in a yard, or that a skirt which measures 30 inches in length will not be more than one-half to three-fourths of an inch shorter after washing. These trade-practice rules, however, do not make labeling compulsory; it is still optional with the manufacturer. However, if he uses a so-called shrinkage label or in any way represents the product as being preshrunk, such labeling and representations must be truthful and, under the rules, must show the amount of residual shrinkage. If no labels or representations as to shrinkage are used in connection with the article the purchaser can assume the product has not been preshrunk and will be liable to shrink when washed.

Preshrinking is generally considered to apply only to cotton, but some methods that produce shrink-resisting wool fabrics are now in use. Shrinking wool cloth before putting it on the market is not new by any means. For example, fulling, a step always included in finishing wool materials, is a preshrinking process. One outstanding method is based on the same felting property of wool. It consists of steaming and pressing and is used principally on women's coat, suit, and dress materials. After this treatment the fabric is supposed not to have more than 2-percent residual shrinkage, and is so labeled.

Preshrinking of wool

Another method for shrinking wool, known as the chlorination process, differs from the fulling or steaming process in that it removes some of the fiber scales and thus destroys the felting property to some extent. If too much of the scaly covering is removed from the fiber the durability of the wool is materially impaired and little wear may be obtained from the garment. Chlorinated wool is used principally in underwear and to a lesser extent in hosiery.

Special Finishes

Before a fabric is ready for the retail market, it goes through many finishing processes to enhance its appearance and to make it more useful. The aim of some of the newer chemical treatments is to give crispness and stiffness that will not disappear during the first tubbing; or to impart resistance to creasing, wrinkling, and crushing; or to render fabrics repellent to moisture, perspiration, spots and stains; or to guard against shifting of yarns. Other proofing treatments are intended to protect cloth against moths, mildew, and fire, but they are not always entirely satisfactory or permanent.

Every effort is being made to apply these new finishes so that they will last as long as the fabric is in use. Attempts are also made to develop a practical way to restore the finish when it is removed or made less efficient by repeated laundering or dry cleaning as is often the case with water repellents.

Fabrics that will retain their crisp, fresh look after wear in warm weather are in particular demand. Certain finishes, sometimes more or less erroneously called permanent finishes, aim to produce these properties. To be entirely satisfactory they must last as long as the fabric is in use, and the new treated cloth must look the same as the untreated.

"Permanent" stiffness

Many materials with these so-called permanent finishes are on the market. Some of the very sheer ones, such as voile and organdy, get their crispness from parchmentizing and to some extent from crease-resistant treatments. The heavier fabrics are usually finished with a chemical that binds the stiffening agent into the cloth.

Still another process fuses several layers of material together to produce a stiffness that will endure repeated laundering. Though considerably stiffened, the resulting fabric is pliable. It becomes limp when wet but regains its stiffness if ironed while damp. These fused materials are sometimes called multi-ply

fabrics. Their principal use at present is in men's wear—in soft collars and dress-shirt bosoms.

These finishes give a smooth, lustrous, somewhat stiff, linenlike appearance and hand, or texture, to an otherwise limp material. It is claimed that they also lessen the tendency to soil, prevent yellowing with age, and reduce shrinkage, but whether they will last as long as desired is always a question.

Crease- and crush-resistant finishes

The aim of crease-resistant finishes is to keep cotton, linen, and rayon (particularly spun rayon) materials from wrinkling in sharp lines and to enable them to spring back from their crumpled state. Such a finish does not necessarily prevent a fabric from creasing or wrinkling at all, but it should greatly reduce the amount of pressing required to keep it in condition. In some cases crease-resistant finishes add firmness, strength, and greater durability. Also fabrics given this treatment have often been found to shrink little, if any, in washing.

Since these finishes do not alter the appearance of the cloth, it is difficult to identify them in the stores unless they are labeled. Even so, squeeze a handful of the cloth, then release it. If the material springs back, it probably has good crease-resistant properties. But if it stays crumpled, the chances are a great deal of pressing will be required to keep it looking well.

Crush-resistant treatments applied to velvets are intended to keep the pile from mashing down readily. They also make it easier to raise the pile and to restore the fabric to its original appearance.

Crease-resistant finishes should withstand several dry cleanings or washings, but care must be used. The washing directions usually advise lukewarm water, mild soap, and gentle handling. It is best to squeeze the suds through the fabric rather than to scrub the cloth between the hands.

Water or moisture repellents

Though a moisture-repellent finish may not render a fabric entirely waterproof, it may lessen or prevent possible damage from perspiration, rain, or spilled liquids. Such a treatment can be given to fabrics of practically any fiber, and while it may be partially or wholly removed by laundering, some of the methods now in use produce a finish that endures through several washings. Some fabrics treated with these moisture-repellent finishes look and feel as they did in the first place. On others, such as oiled silk and oilcloth, the finish coats the fabric and changes the original appearance.

Prevention of yarn slippage

A special finish claimed to lessen the shifting of yarns within the cloth or along cut edges has been developed primarily for rayon coat linings and loosely woven satins, which fray badly. Besides preventing excessive frayage, the treatment is said to reduce complaints about sagging, stretching, and shrinkage. It is claimed to withstand dry cleaning and pressing but not washing. In some cases, however, the use of such a treatment really amounts to doctoring up a sleazy material which at best will give little satisfaction.

Clothes moths and carpet beetles generally attack wool and hair fabrics unless they are protected in some way. Occasionally one finds a fabric or garment labeled as mothproof. Generally though, there is no indication as to how effective this protection may be, how long it will last, or what adjustment will be made in case it fails. Here again the finish is too recent a one for the consumer to be sure it will do all that may be claimed for it.

Moth protection

When textiles such as the canvas used on the farm, shower curtains, and even clothing are put away damp, they are likely to mildew, particularly in warm weather. This condition is aggravated if the cloth is soiled even slightly or finished with a dressing that provides food for the mildew organisms. Even when there is no such source of food, the fungi or molds may grow by feeding on the fibers themselves. It is claimed that various fungicides prevent mildew, but for the most part they do not lend themselves to home application. Moreover, the effectiveness of such treatments is uncertain since most of the materials used are soluble in water or organic solvents. This means that as soon as the fabric is laundered or dry-cleaned, the mildew resistance is destroyed.

Mildew preventives

Most "fireproofing" treatments keep fabrics from burning but do not protect them from charring and disintegrating when subjected to high temperatures. Different kinds of chemicals are used for this purpose. One type decomposes upon heating and gives off noninflammable gases that smother the flame. Another melts when heated and forms a sort of glaze over the cloth. Fabrics treated with such materials char but seldom blaze. A third type prevents flaming but does not prevent glowing.

Fire-proofing finishes

Since small articles can be quite easily fireproofed in the home (Farmers' Bulletin No. 1786, Fireproofing Fabrics) ironing-board covers and pads, curtains, and children's clothing should be treated. Washing destroys the effect, but a new application can be given without great difficulty.

Cotton fabrics have long been treated to give them some of the characteristics of linen. Even though linen weaves are imitated and the materials finished to give them body, luster, and smoothness, the character of linen is still sometimes lacking. Some of the newer chemical finishes attempt to make cottons resemble linens even more closely now than in the past. By one method a thin coating of dissolved cellulose acetate binds the short fibers to the yarn. By another method the protruding fibers and fuzz are dissolved from the surface of the cloth. This makes a smoother, more porous fabric and, at the same time, adds a certain degree of stiffness. With either of these methods the fabric must have a linen-type weave, such as suiting or damask. While these processes produce a desirable finish on new cloth, it is uncertain whether they will last the life of the fabric.

Linenlike finishes

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